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JANUARY, 1899.
VOL. XII, No. 10.

THE OTTAWA NATURALIST.

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SOIRÉE No. 4—O.F.N.C. Feb. 7th, 1899, Y.M.C.A. Lecture Hall.

1. Paper by W. T. Macoun, Esq., on "NATIVE HERBACEOUS PERENNIALS."
2. " W. S. Odell, Esq., on "FRESH-WATER POLYZOA."
3. " H. M. Ami, on "BURROWING HABITS OF THE CRAYFISH."

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THE OTTAWA NATURALIST.

VOL. XII. OTTAWA, JANUARY, 1899. No. 10.

NOTES ON SOME OTTAWA VIOLETS.

By JAMES M. MACOUN,

Assistant Naturalist, Geological Survey of Canada.

While "Manual" writers, the compilers of local lists and American botanists in general were satisfied to lump into one species—one variety in fact—the several forms of what for so many years had been known as *Viola cucullata*, or *V. palmata*, var. *cucullata*, Canadian botanists have for more than a quarter of century known that this "species" or "variety" included many species and made repeated attempts to induce the recognized "authorities" to at least differentiate a number of varieties. In this they were uniformly unsuccessful. Dr. T. J. W. Burgess made at London, Ont., a special study of the violets of the *cucullata* and *sagittata* groups, Dr. Jas. Fletcher at the same time studied the violets of this vicinity, and Prof. John Macoun thirty years ago noted on his herbarium sheets the characters upon which several of the new Canadian species are founded. Other Canadian botanists have done work on similar lines.

The trouble in Canada was, and is, that none of our libraries, public or private, contained all the necessary books, monographs and revisions. When Canadian botanists discovered what they thought to be a new species they had but one course to follow. The specimens must be sent to some botanist in the United States or Europe and his decision was final. New discoveries were almost without exception given the names of well-known species. There is but little doubt that in one or other of the herbaria of the older Canadian botanists most of the species recently described by Dr. Greene have been separated from *V. cucullata*.

However this may be, I have had no opportunity of examining these herbaria and whatever of value there may be in these notes is the result of my own work in the vicinity of Ottawa during the spring and summer of 1898. Realizing that without some rare works on violets to which I have not access, mistakes would certainly be made, I gladly availed myself of the willingness of my friend Dr. Edw. L. Greene to assist me in my work and sent him a full series of the specimens as they were collected. It was a great satisfaction to me to find that he entirely agreed with my separation of the local violets of the *cucullata* group into six species and his diagnosis of these from living material is in every respect satisfactory.

Mr. C. L. Poland in a recent paper on Acaulescent Violets, says: "At the outset I wish to emphasize the importance of unremitting field-work and the absolute uselessness of herbarium material unless one is fortified by previous familiarity with the growing plant." With this I heartily agree. Pronounced as the characters are upon which the species described in this paper are separated, great difficulty might still be experienced in determining dried specimens of one gathering, especially flowering plants before the appearance of the apetalous flowers. The method pursued in collecting the series upon which the following new species were described is, I believe, the only one which will insure satisfactory results. The early flowers were collected in May, the stations at which they were collected were carefully marked and visited again ten days or two weeks later, and then two or three times in June and July. The result was that with the complete series before him a child could separate the species.

Though much has already been done, this group of violets requires further study and I can confidently prophesy that at least one additional species will be added to the Ottawa Flora.

The beautiful and accurate drawings made by my friend Mr. Theodor Holm constitute the most valuable part of this paper. His work has been so carefully done that no collector need in the future experience any difficulty in determining any

of the five species here recorded as growing in the vicinity of Ottawa, and my only excuse for reprinting here the descriptions already published by Dr. Greene is that they and the figures of the plants described may be found under one cover.

VIOLA SEPTENTRIONALIS, Greene, Pittonia, vol. III, p. 334.

(Plate II, Fig. 3.)

Acaulescent, gregarious, low, 4 to 5 inches high at petaliferous flowering; herbage rather light green, the leaves and petioles sparsely clothed with stiff straight spreading hairs, these most numerous beneath and along the veins; leaves from reniform in the lowest to round-cordate, strongly cucullate when young, lightly and very regularly crenate, all obtuse; peduncles (about equalling the leaves) bibracteolate near the middle; sepals small for the size of the flower, with prominent truncate auricles, the whole margin finely and closely ciliate; corolla pale violet, rather large, 9 or 10 lines long and broad, all the petals broad, usually all obcordate, notched at the broad apex, the upper pair sometimes merely obtuse; the odd or lower one amply expanded and as long and as broad as the others, this and the pair next to it hairy at base (on the claw), and sparingly so on the blade; apetalous flowers aerial, but on very short slender and horizontal peduncles, their pods very short and nearly oval.

Rich soil in thickets and open woods, Billings's Bush, south-east of Billings's Bridge, Ottawa; in full petaliferous flower, 10th May, 1898, and in fruit from the apetalous flowers three weeks later. Distributed as Geol. Survey of Canada Herb. No. 18,561. Described from specimens collected at above locality but not rare in suitable situations elsewhere near Ottawa.

According to Dr. Greene its southern and eastern U. S. homologue is the plant called by him *V. obliqua*, Pittonia, vol. III, p. 142; "but it is also allied and by its foliage more nearly to *V. cuspidata* of the far-western lake and prairie regions, and is distinct enough from either by a redundancy of characters. If it has the hairiness of *V. cuspidata* it has quite another quality

of herbage, aerial apetalous flowers and fruits, and large obcordate petals instead of deeply coloured and cuspidately acute ones."

VIOLA MACCOUNII, Greene, Pittonia, vol. III, p. 335.

(Plate 1, Fig. 1, a, b.)

Rather larger than the preceding; early leaves subreniform-deltoid, 1 inch long, $1\frac{1}{2}$ inches broad, firm and rather fleshy, crenate, villous-hirsute beneath and on the upper part of the petiole, only sparsely hairy above, but the margin ciliate; pedicels bibracteolate in the middle; sepals broad, obtuse, ciliate, somewhat callous-tipped; petals lavender-colour, very deciduous or almost caducous, all remarkably narrow and elongated, the two upper rather smaller than the others, the odd one the largest, all sparsely hairy over almost the whole inner face, the claws more or less distinctly ciliate; peduncles of the late apetalous flowers slender, short, horizontal, buried under decaying leaves or twigs; their pods distinctly trigonous, short and thick, as broad as long, dark with numerous purple blotches, the shortly and obtusely lanceolate sepals and their auricles ciliate.

On dry limestone shingle, growing among grasses in the shade of cedars. Very abundant at the foot of the ledge of rocks that runs from the north-east corner of Rideau Hall grounds to the Ottawa River at Governor's Bay. The type locality. Distributed under Herb. No. 18,746. Collected by Prof. John Macoun west of the Beaver Meadows, Hull, Que., Herb. No. 18,900. First collected at the type station in 1884 and labelled "form 3" of *V. cucullata*.

VIOLA VENUSTULA, Greene, Pittonia, vol. III, p. 335.

(Plate 1, Fig. 2, c, d.)

Dwarf with light-green glabrous herbage; leaves cordate-ovate and deltoid-ovate, acutish, rather sharply and serrately crenate, cucullate when young, the blade less than an inch long, the slender petioles 1 to 3 inches long; earliest peduncles barely equalling the leaves, the later surpassing them; corolla large for the plant, often $\frac{1}{2}$ inch or more in breadth, deep violet-blue;

petals broad, obtuse, the odd one well expanded, nearly equaling the others, truncate or retuse, only the two laterals bearded at base with clavellate white hairs ; earliest apetalous flowers on slender peduncles equalling the leaves, but all the later ones short peduncled and almost or altogether subterranean ; capsule very short and thick, roundish-obovate.

Type specimens were collected in the wet meadow between the Rockcliffe road and Governor's Bay, Ottawa. It grows on tussocks with *V. blanda* and except in May cannot be found unless the exact locality be known, grasses and other flowers hiding the smaller plant from view. Distributed as No. 18,565. Specimens of this species have been sent me from Charlottetown, P.E.I., by Mr. L. W. Watson.

VIOLA CUCULLATA, Ait.

(Plate v.)

This is the commonest blue violet in the vicinity of Ottawa, always growing on very wet ground, generally by rivulets and small creeks. Dr. Greene's note on this species (*Pittonia*, vol. III, pp. 143-4) includes all its important distinguishing characters and is here reproduced in part.

This is a very glabrous plant, of tender and succulent herbage, decidedly cucullate leaves, light green in colour, flowers very pale blue, the petals with a spot of darker violet just above the white basal part or claw. The cleistogamous flowers are borne on greatly elongated very slender peduncles which are strictly erect, both the growing and full grown ovaries being a half-foot or more above ground among the leaf-blades. The capsules are very long and quite prismatic, *i.e.*, of equal thickness from one end to the other, and distinctly though obtusely trigonous.

VIOLA CUSPIDATA, Greene, *Pittonia*, vol. III, p. 314.

(Plate IV and Plate III, Fig. 5.)

Acaulescent, low, at time of petaliferous flowering 3 or 4 inches high ; leaves round-cordate, cucullate, crenate-serrate

veiny and rugose, short-hirsute as to the petioles and along the veins beneath, sometimes also on the upper face, and the margins ciliolate; sepals obtuse, ciliolate from the base to the middle; corolla about 8 lines long and 9 in breadth, deep blue, the paired petals broad-obovate, abruptly acutish, the odd one nearly equalling those next to it, of oblong-obovate outline, fully expanding; the apex almost truncate but cuspidately pointed in the middle.

Very abundant in woods and thickets along the bank of the Rideau River from Billings's Bridge to the C. P. Ry. bridge. Distributed from the herbarium of the Geological Survey as No. 18770. Specimens of this species have also been received from Mr. J. M. Dickson, Hamilton, Ont.

VIOLA AFFINIS, Le Conte.

The specimens which are for the present doubtfully referred here were collected under over-hanging banks near the water's edge along the Rideau River above Billings's Bridge. The material collected was not sufficiently complete to allow of satisfactory determination of the species.

VIOLA POPULIFOLIA, Greene, Pittonia, vol. III, p. 337.

Plate III, Fig. 4.)

An acaulescent blue-flowered woodland violet akin to *V. cuspidata*, but smaller. the petioles of the early leaves densely villous-hirsute, the blade from broad-cordate in the very earliest and smallest to deltoid or deltoid-reniform in those accompanying the petaliferous flowers, notably broader than long, both surfaces but more conspicuously the lower, hirsute-pubescent, especially along the veins; corollas large, rather light blue, all the petals broad and obtuse, the odd one like the others but a little longer; sepals of the petaliferous flowers oblong, obtuse, hispidulous below especially the auricles; apetalous flowers of summer and autumn very short-peduncled and horizontal or partly buried, but the peduncles slender; sepals small, glabrous;

Pods triquetrous-ovoid, finely dotted, 4 to 5 lines long; late foliage nearly glabrous, but rather fleshy.

Collected by Mr. J. M. Dickson near Port Flamboro, Ont., May, 1898, and grown by Dr. Greene and the writer. The growing plants are very easily distinguished from *V. cuspidata* to which it is closely related. Included in this paper in order to complete the enumeration of the Ontario species as far as they are known.

Ottawa, Dec. 1898.

REPORT OF THE BOTANICAL SECTION, 1898.

In the Botanical Branch there has been more than usual activity during the past season. At all the sub-excursions, of which there have been more than in any previous year, of the Club's history, the followers of the botanical leaders have always been by far the most numerous. Accounts of these sub-excursions have already appeared in THE OTTAWA NATURALIST, and need not be referred to here.

An unusual advantage to the Club during the past season has been the large proportion of the meetings at which Prof. Macoun has been able to be present. Unfortunately Mr. Robert Whyte is still unable to take an active part in the field work of the Club; but he has been well represented by Miss Marion Whyte a member of the Council of the Club who has been a constant attendant at the excursions throughout the season.

Several additions have been made to the local flora during the year. Since the completion of Prof. Macoun's "Cryptogamic Flora of Ottawa" published in THE OTTAWA NATURALIST eight species of lichens and six of mosses have been added by him to the local list. In September and October Prof. Macoun collected over 600 species of fungi in the vicinity of Ottawa. Of these, many were additions to the local flora, a few were new to America though found in Europe and several were new to science. Mr. Percy Saunders also made a special study of fungi

during the autumn months adding several species to the local lists.

A critical study of the acaulescent violets of the vicinity was made by Mr. J. M. Macoun, and six species were found to have been included in what has been generally known as *Viola cucullata*. Of these, three are new to science, and two had not been before recorded from this region.

What has been commonly known as *Antennaria plantaginifolia* has also been separated into many species by specialists and three of these have been found in the vicinity of Ottawa.

Several rare local species were again noted this year by members of the Club. Some of these are now nearly extinct in this district and for that reason it is thought well to draw attention to them.

Mention may be made of *Aralia quinquefolia* found at Beechwood and *Claytonia Virginica* near the outlet of Dow's Swamp. Two of the rarest plants in this vicinity were again seen—*Listera australis* at Mer Bleue and *Aspidium spinulosum* var. *Braunii* at Chelsea. *Botrychium Lunaria* a very rare fern was found by Mr. J. M. Macoun to be locally abundant on the railway embankment near Stittsville and is an addition to the local list.

Our botanists do not sufficiently appreciate the usefulness and value of the National Herbarium housed in the Geological Survey Museum. This herbarium now contains between 80,000 and 90,000 sheets of specimens which are available for study and reference by any one who cares to utilize them.

The Normal School collection of plants has been considerably enriched during the year by donations from members of the Club. Prof. Macoun has presented 100 sheets of Cryptogams and smaller collections have been presented by Drs. Ami and Fletcher. Members of the botanical section are requested to send in to the leaders any specimens of which they have duplicates so that this collection may be as complete as possible in

the species which grow wild near Ottawa and which therefore are more likely to be of value to the Normal School Students than species found in other parts of the Dominion.

Another public institution to which reference may again be made is the Botanical Garden and Arboretum at the Central Experimental Farm where there are now growing 2000 species of trees and shrubs and 1200 species of herbaceous perennials. These collections are available for reference by students at all times.

The leaders again call the attention of the botanists to the comparatively large proportion of the Ottawa district which has not yet been exhaustively examined and trust that during the coming season the activity shown this year will be continued.

Leaders: { D. A. CAMPBELL,
J. M. MACOUN,
R. B. WHYTE.

ORNITHOLOGICAL NOTES.—W. T. MACOUN, Editor.

I. AN ALBINO EAVE SWALLOW.—By Geo. R. White, Esq., Ottawa.—On September 5th, 1898, I witnessed the flocking up, preparatory to migrating, of large numbers of the Cliff Swallow. The birds were arriving in flocks from all quarters of the compass, and by 9 o'clock a.m. there were over a thousand. With them were a few Barn and Bank Swallows with a stray Chimney Swift. This large flock kept flying up and down over a large stretch, nearly a mile of marsh land, never remaining in one place more than ten minutes at a time. This performance was kept up all day, and next morning the place was deserted; only a few odd birds were seen. While watching the movements of the swallows my attention was attracted by a white bird that kept with them. In the afternoon I was enabled after three hours' hard work to examine it, an Albino of the Cliff or Eave Swallow *Petrochelidon Lunifrons*. A short description of this specimen and of a full plumed male is as follows:

The Albino—Bar across forehead, throat and upper tail coverts with a few odd feathers about head, pale rufous, re-

mainder of plumage pure white ; bill, black ; feet, pale brown ; length, 5 inch ; extend, 12 inches.

A male in full plumage would be as follows : Back and top of the head with a spot on the throat, deep lustrous steel blue, that of the crown and back separated by a greyish nuchal collar, frontlet, white or brownish white ; shorter upper tail covert, rufous ; chin, throat and sides of head, intense rufous, sometimes purplish chestnut prolonged around the side of the nape ; under parts dull greyish brown with usually a rufous tinge and dusky shaft lines whitening on the belly ; the under tail coverts, grey, whitish edged and tinged with rufous ; wings and tail, blackish with slight gloss ; bill, black ; feet, brown ; tail, nearly square ; length, 5 inches ; extent, 12 inches.

One of the earliest notes on this notable swallow is by J. R. Foster, dated 1772. Audubon states he first observed Cliff Swallows in 1815. Sir John Franklin found them on his journey from Cumberland House to Fort Enterprise in 1821. Dr. Richardson states that the first appearance of this species at Fort Chippewyan was on June 25th, 1825. Mr. G. A. Boardman states that they were found at St. Stephen, New Brunswick, in 1828. Dr. Brewer notes them at Coventry, Vt., in 1837. In 1861 a large colony was found breeding on the cliffs of Anticosti. The swallow tribe is so constantly under observation that it is a wonder more instances of albinism have not been noted. Albinos of the following species have been recorded : *Cotyle riparia*, in the year 1859 ; Slate-coloured Chimney Swift, in 1863 ; Cream-coloured Sand Martin, in 1867 ; Barn Swallow (*Hirundo Horreorum*), in 1870 ; and in Bull. Nutt. Club for 1876, mention is made of albinos of the Purple Martin and Tree Swallow.

II. WHITE-THROATED SPARROW (*Zonotrichia albicollis*).—
On the 8th of December, 1898, while at Russell, Ont., Mr. Lees observed a specimen of this bird. It seemed in good spirits notwithstanding the lateness of the season.

III. ROBIN (*Merula Migratoria*).—While snow-shoing in the vicinity of Billings's Bridge on the 2nd of January, Mr. C. H. Young saw a robin flitting about near a running stream. Having identified the bird he continued his way; but on the following day in order to convince sceptical members of the Club he shot it. It proved to be a young male bird in fair condition. One of the legs, however, had a swelling at the first joint and was quite stiff, which may have detained him here when his fellows went south.

BERMUDA: LIFE BENEATH THE WATERS.*

There is probably no part of the globe in which a greater variety or more excellent quality of fish abounds, than in the waters bordering the shores of Bermuda. It is asserted that as many as 168 varieties have been observed there, most conspicuous amongst which for its beauty is the "Angel Fish," of a cerulean blue, peculiar shape, and at the same time esteemed as a table delicacy, tho' to a naturalist the idea of eating so beautiful a creature would be akin to cooking a Bird of Paradise. The "Yellow Tail" is pale azure on the back and pearly white below, with broad bands of yellow along each side. The "Spotted Snapper" also carries these yellow bands, but its body is white, fins rosy pink with an oval patch of black on each flank, whilst another variety has yellow fins and scarlet spots. The "Red Snapper," "Bream," "Grunt," "Rockfish," "Mullet," "Porgie," "Gruper," "Sennet," "Hogfish," "Amberfish," besides many others, are daily to be seen as the fishing-boats come in, and are well worthy of notice.

The large Aquarium on the Battery in New York City possesses numerous specimens of Bermuda fish, and there is every reason to hope that before long a Biological station may be established on the Bermudas similar to the institution now in operation at Wood's Hole Massachusetts, the joint action of which embracing as it would either side of the waters of the

*Extract from H. B. Small's "In the Bermudas."

Gulf Stream and the former getting the wash or outside eddy of the Sargossa Sea, could not fail to materially add to ichthyological research.

Turtles, though not attaining the large proportions of those in more southern waters are taken of a fair marketable size, and always meet with a ready sale. They are kept in shallow wells or tanks close adjoining tidewater, so that the market may never be glutted with them. The "Green" and the "Hawksbill" are the two commonest species, although occasionally a rare visitant from further south is taken.

On a calm day it is not an uncommon sight to observe the skimming flight, if such it can be called, of the graceful little "Flying Fish," whose silvery sides flash in the sunlight like polished metal, but when a shoal of them is followed and attacked by great unsightly grupers (weighing from 12 to 18 pounds), beneath whose thick red lips lies a row of malicious looking teeth, there is an activity manifested that excites an intense interest in the scene. Hundreds of flashing sparklets of silver flying or skimming hither and thither in all directions, with the swirl caused by their pursuers affords a scene better witnessed than described. I have sat by the hour on the rocks frowning along the North Shore on a perfectly calm day watching such a scene, to which the alternate emerald and opaline tints of the water add an enchantment, till the eye never wearies of the spectacle.

Life under the waters is remarkably active and brilliant along those shores, with coral, sea-fans, sea-roids, sea anemones of all kinds and hues, and large masses of "brain-coral" teeming with life. Castle Harbour and Harrington Sound are the most favourable places for observation. Sea-weeds also of every hue, black, green, red, bronze, pink, yellow, sway gently back and forth, or in the deeper water silently grow in these veritable sea gardens.

The Pearl Oyster and Scallop are abundant, and several species of *Cytherea* or "clams" are available for the table.

These waters are also the paradise of the sea urchin (*Echinus*) and the great black "Sea Cucumber." (*Holothuria*.)

Crabs are abundant and of several kinds, but attain no size. I failed to find trace of Lobsters or Sea Crawfish. Along the shores, burrowing in the sand, and on the margins of fields near the shore there is a crab, that seems amphibious. It is a nuisance to the planter, as it burrows much like the mole.

In instructions to the "Governor of the Bermuda plantations," dated 1665, sharks were claimed and to be considered a royalty. Although an occasional shark is caught they are no longer numerous inshore, preferring to have their habitat along the outer boundary reefs.

An occasional whale is to be seen off the coast, but is now a rare visitant. Formerly whales were abundant and one of the earliest industries of Bermuda was the whale fishery. In a work published in London in 1613 by one Sylvanus Jourdan, being an account of the "Bermudas now called Sommer's Islands," he says, "there are plenty of whales which come so usually and ordinarily to the shore that we heard them oftentimes in the night abed and I have seen many of them near the shore in the daytime." Only two or three years ago a large whale was captured off the south shore, and was an object of interest for days, the "whale beef" being in great demand. The old trying out furnace and melting house, rudely constructed on a height of land adjoining one of the bays in Warwick parish is still in existence, and could be made use of again if required. In the early instructions to the Governor of the colony, allusion is made to the revenue to be derived from the whale fishery, and from the collection of Ambergris and Spermaceti, but what revenues were ever obtained therefrom do not appear in subsequent records. In a sequel to Jourdan's first report, he says "there are whales in great store from February until June. * * * * * The *Octopus* finds a safe retreat in the crevices of the coral, and attains a large size. I saw a specimen whose tentacles were nearly three feet in length, washed up in a storm,

and its hideous glaring eye and formidable beak make it a most repulsive object.

Owing to the heavy surf beating on broken coral, shells in a perfect state are rare on the shore, the specimens for collection being dredged from among the reefs.

H. B. SMALL.

THE GEOLOGICAL SOCIETY OF AMERICA.

The *Eleventh Winter Meeting* of the *Geological Society of America* was held in New York City from December 28th to 30th, 1898. There was a large attendance of fellows, and more papers than could be conveniently read were presented. The Sessions were held in Shermerhorn Hall, Columbia University at Morningside Heights. An address of welcome by President Low of Columbia was followed by Reports of Council and declaration of vote for officers for 1899, which is as follows:—
President: B. K. Emerson; *Vice-President*: G. M. Dawson; *Secretary*: H. L. Fairchild; *Treasurer*: I. C. White; *Editor*: J. Stanley Brown; *Librarian*: H. P. Cushing, and *Council* of three.

The necrology of the late Prof. James Hall, well known to many members of the Club, by the retiring President, J. J. Stevenson, was a worthy tribute and memorial to so great an administrator, geologist and palæontologist.

The Presidential address by Prof. J. J. Stevenson was both a useful and practical retrospect in the work of early geologists as well as a hopeful look forward into the future of "Our Society."

The following are some of the papers read and presented to the Society by Canadians.—

A Remarkable Landslip on the Riviere Blanche, Portneuf County, Quebec.

By DR. GEORGE M. DAWSON, Ottawa, Ont.

In this paper a brief account is given of the landslip that occurred on May 7th, last. It affected the thick deposit of Leda clay that floors this part of the St. Lawrence plain and serves to indicate that a clay of

this character may, under certain circumstances for a short time, behave almost as a liquid. This paper which proved most interesting, and instructive, was illustrated with lantern slides.

The Iroquois Beach at Toronto and its Fossils.

By PROF. A. P. COLEMAN, Toronto, Canada,

The Iroquois beach north of Lake Ontario, was long ago mapped in outline by Prof. J. W. Spencer, but many details in this shore line remained to be filled in. Near Toronto, two bays are found, one near Carlton on the west, the other near York on the east, each had an area of several square miles and was cut off from the main lake by a gravel bar like the present Toronto island. Horns of caribou are common in the Carlton bar and teeth of the mammoth have been found in the bar near York. Fresh-water shells of four species, *Campeloma decisa* the most common, are found in beach gravels of Iroquois age near Reservoir park, Toronto. These are the first fresh-water fossils found without doubt in the Iroquois beach deposits. As the main Pleistocene beaches from Agassiz to Iroquois contain fresh-water shells, they must have been formed in lakes and not arms of the sea. The numerous marine shell-bearing deposits of the east of Canada cease before Lake Ontario is reached.

Outline of the Geology of Hudson's Bay and Strait.

By Dr. ROBERT BELL, Ottawa, Ont.

Dr. Bell described the Hudson Bay depression and contrasted the opposite sides of the same. The Archæan formations were described by him and he made general remarks on the nature of their distribution. The Laurentian, Huronian and associated Ausinikis and Nipigon series. The Galena-Trenton formations as noticed on the Nelson and Churchill in Ungava and Frobisher Bay consisted of some 900 feet of horizontal strata. This was followed by notes on the Silurian of Mansfield Island and the Devonian areas of Southampton Island, the Severn Region, the Missinaibi or James's Bay areas.

The highest mountains in Eastern America between 8,000 and 9,000 feet above sea level occur in the North-eastern portion of the Labrador Peninsula.

In the interesting discussion which followed Dr. Bell's paper it was brought out that in Amherst College are deposited the collections of Trenton and other palæozoic fossils from Frobisher Bay. The presence of a species of *Triarthrus* indicated the occurrence of the Utica formation. Prof. C. Schuchert's collection of Trenton fossils from Baffinland was stated to be in the Smithsonian Institution, Washington and that Silurian strata are recorded by Kendall from the South shore of the Cumberland Coast in the American Journal of Science.

The Gold-Bearing Veins of Bag Bay, Western Ontario.

By Mr. PETER MCKELLAR, Fort William, Ontario, Canada.

The object of this paper was to show the peculiarities of the gold-bearing veins in the granite area of Bag Bay, Shoal Lake, west of the Lake of the Woods, Ontario. These veins are characterized by the smallness of the quartz fissures compared with the quantity of valuable ore they yield under development. This paper was presented and read by Dr. Bell.

Glacial Phenomena in the Yukon Territory.

By Mr. J. B. TYRRELL, Geological Survey Department.

In this paper the author describes the direction of the glaciation which he noticed during the summer of 1898, together with notes on the various glacial deposits met with on Bonanza, Stewart, Eldorado and other creeks in the Yukon District of Canada.

Gold Mining in the Klondike District.

By Mr. J. B. TYRRELL.

This paper was illustrated with lantern views from photographs taken by Mr. Tyrrell during the past summer. It gave a most instructive view of the large amount and character of the gold placer mining carried on within Canadian territory in the Klondike.

Amongst other papers interesting to Canadians were the following:—

Pre-Cambrian Fossiliferous Formations.

By the Hon. Charles D. Walcott, Director of the U. S. Geological Survey, Washington, D.C.

This paper opened with a description of the pre-Cambrian formations which have yielded traces of life, including the announcement of the discovery of fossils indicating highly organised life in the pre-Cambrian belt terrane of Montana. One of the forms described has a strong resemblance and affinity to certain Silurian Eurypterids.

The Faunas of the Upper Ordovician in the Lake Champlain Valley.

By Theodore G. White, of Columbia University, New York City.

In this paper Dr. White gave the results of a detailed study of the consecutive faunas contained in each stratum at numerous localities through-

out the length of the valley. A complete section is afforded from the base of the Black River formation through the Trenton and terminating in the Utica. Species hitherto reported only from Canadian localities are found associated with those characteristic of the Trenton Falls type-province, showing the Champlain connection of Ordovician seas. Several zones characterized by restricted species are located, and also "conglomeratic zones." The fauna is very abundant and supplies a basis of comparison for similar detail study from other provinces. The occurrence of the Hudson River and Oneida groups in the region is questioned.

The repeated statement of many geologists that the Utica of the Lake Champlain Valley is everywhere found lying unconformably over the Trenton is no doubt based on accurate local observation. It must not be argued however that the Utica is thus related to the Trenton. Dr. T. Sterry Hunt used to insist that the Utica and Trenton were not conformable to each other and connected by passage beds. If such be the case in the Lake Champlain region, such a view cannot for a be held in a basin like the Ottawa Palæozoic Basin. The occurrence, relative abundance or paucity of certain forms at different horizons in the Trenton of the Lake Champlain Valley showed considerable variation as compared with forms found by us in the Ottawa and St. Lawrence Valleys.

"Structure of the Iola Gas Field, Allen Co., Kansas."

By Prof. EDWARD ORTON, Columbus, Ohio.

The following is the abstract submitted by Prof. Orton, the most eminent authority on "Natural Gas."—Natural Gas is more widely distributed, geologically and geographically, and exists in larger quantity than any one would have claimed twenty or even ten years ago. Its productive horizons cover the entire palæozoic column of the country. Cities supplied, at least partially, with natural gas for fuel and light are no longer uncommon. Two distinct divisions can be made of gas accumulations, viz.: That which is stored in *impervious rocks* as shales, most limestones, etc., and that which is found in *porous rocks*. These divisions may be provisionally styled *Shale gas* and *Reservoir gas*; each having characteristics of its own. *Shale gas* occurs in comparatively small wells. Its wells lack uniformity of rock pressure. It does not occupy definite horizons; it exists independently of petroleum in many cases, has *staying* properties—does not depend on the structural arrangement of the strata that contain it. *Reservoir gas* is found in great wells; approaches uniformity of rock pressure in each subdivision of territory, occupies definite horizons, is accompanied by oil, its wells generally come to a sudden end—is entirely controlled by the structure of the rocks in which it is accumu-

lated. Two structural phases of rocks are specially important in this connection, the *anticline* and the *terrace*. The time has come for the acknowledgment of *structure* in reservoir gas fields even in advance of measurements. The Iola gas field is one of great promise. Its source is in a sandstone of the Cherokee Shales, or near the bottom of the Coal Measures. It proves to be a *terrace* of well marked character. For seven miles the top of the gas rock has an elevation of 131 feet above tide, rising at no point more than 45 feet above this. At this summit, the largest well of the field is located.

One feature brought out in this paper is the great value of natural gas as a fuel. Prof. Orton argues strongly in favour of legislation in order to compel, if possible, the use of natural gas only as a fuel for family or domestic purposes. He considers it too valuable an element altogether to be employed in the baser uses for manufactures.

The Mica Industry of the United States, New Mexico, the Rocky Mountains, and North Carolina.

By Prof. W. H. Holmes, presented his paper

which gave a great deal of valuable information on the mode of occurrence of this important industry.

The Newark System in New York and New Jersey—

By Prof. Henry B. Kümmel, of Chicago, described

a series of strata which are contemporaneous and probably similar in origin to the so-called "New Red" and "Triassic Sandstone" of the Minas Basin, Cornwallis and Annapolis valleys, and elsewhere in the province of Nova Scotia and in Prince Edward Island. Even the intrusive and extrusive trap sheets so characteristic of the New York and New Jersey series in the Newark system also occur in Nova Scotia, especially in the North Mountain region of Kings and Annapolis Counties and in Cumberland and Colchester counties as well.

The Archæan-Potsdam contact in the vicinity of Manitou, Colorado.

By Prof. W. O. CROSBY, of Boston, was of special interest to Canadians. The peneplain mentioned by Prof. Crosby, in early times may apply to the region he describes in Colorado, but not in Eastern Ontario or Western Quebec, in Canada, where the underlying rocks of Laurentian and Huronian age are deeply cut and furrowed to hundreds of feet prior to deposition of the Potsdam. The question may be asked: Are the so-called Potsdam rocks of Manitou truly equivalents of the Potsdam of New York State and Canada?

H. M. AMI.

FIRST WINTER SOIREE.

The first winter meeting of the Ottawa Field-Naturalists's Club was held in the Y.M.C.A. Lecture Hall, December 14th. In the absence of the President, the Vice-President, Prof. John Macoun, delivered the Inaugural address. This address was almost wholly of a reminiscent nature. It was shown that from a very small beginning the Club had grown from year to year until it had become one of the most important institutions of its kind in Canada. Though the progress from year to year had not been great and it sometimes seemed that no progress was being made, one had only to compare what had been done in the early years of the Club's existence with what was being done now to realize that through its stimulating influence interest in natural science in all its branches had each year increased. The membership of the Club showed this. While the original members had continued their work with unabated energy, new members had been almost equally active.

The publication of local lists and notes was in the opinion of Prof. Macoun the most important work that had been done by the Club. By this means all that was worth preserving of each member's work had been put in an easily accessible form and was available for study and reference. In concluding his address, Prof. Macoun emphasized the fact that the young men and women of to-day spent too much of their time in an unprofitable way, and made an earnest appeal to the members of the Club to do all in their power to increase the interest that was already felt in its work.

A paper was read on "Some Local Violêts," by Mr. J. M. Macoun, and the report of the Botanical Branch by Mr. D. A. Campbell. These are published in this number of THE NATURALIST. Dr. Jas. Fletcher gave an interesting account of a monstrous specimen of *Trillium grandiflorum* with green blotched flowers and long petioles collected by Mrs. Chamberlain at Lakefield and figured in THE OTTAWA NATURALIST for June, 1896. The root upon which the figured flower was

grown has been cultivated at the Experimental Farm and has gradually reverted towards the typical form ; the only variation last year being a narrow green stripe down the middle of each petal. A photograph of this *Trillium* was exhibited by Dr. Fletcher, and specimens and photographs of monstrous *Trillia* from other parts of Ontario were shown by the Curator of the herbarium of the Geological Survey.

NOTES, REVIEWS AND COMMENTS.

Transactions of the Ottawa Literary and Scientific Society, No. 1. Press of E. J. Reynolds, 127 Sparks Street, Ottawa, 1898. This volume of 87 pages contains, besides a brief introductory and historical sketch of the society by the president, the following papers :

The Name of Ottawa, by B. Sulte, pp. 21-23 ; *The Violinist*, by Archibald Lampman, pp. 24-26 ; *Place Names of Canada*, by George Johnson, F.S.S., Dominion Statistician, pp. 27-62 ; *The Fur-Seal of the North Pacific*, by James Melville Macoun, Esq., Assistant Naturalist to the Geological Survey of Canada, pp. 63-74 ; "*The Yukon and its Gold Resources*," by William Ogilvie, Esq., D.L.S., &c., &c., pp. 75-78, together with a Meteorological Chart Record for 1887-88, 1895, 1896 and 1897 (Partim). "*Utilisation of Moss Land*," by Thomas MacFarlane, F.R.S.C. pp. 79-87.

The above papers are all of interest and value. As in former years, the members of the Ottawa Literary and Scientific Society who read papers in Ottawa or elsewhere are invited to publish them in THE OTTAWA NATURALIST.

BOOK REVIEW.

ELEMENTARY BOTANY, by George F. Atkinson, Ph.B., Professor of Botany, Cornell University, 444 pages, illustrated; published by Henry Holt & Co., New York. Elementary Botany of to-day is vastly different from that of ten or fifteen years ago. This is largely due to the changed methods of presenting to the student the rudiments of botany. The old method introduced the pupil to the technicalities of systematic botany by way of the arbitrary rulings of the Manual. If he enjoyed puzzles of that kind he specialized in botany and the natural sciences and eventually obtained his reward by seeing the relationship of plants in a broad and comprehensive way; but if these analogies had been first observed it is probable that the "analysis" of the flower would not have appeared so tiresome. This work presented to the public generally, but to teachers particularly, marks an important step in the new direction. This newer method is, in the words of the author, "to study first some of the life processes of plants, especially those which illustrate the fundamental principles of nutrition, assimilation, growth and irritability. In studying each one of these topics, plants are chosen so far as possible from several of the great groups. Members of the lower as well as of the higher plants are employed, in order to show that the process is fundamentally the same in all plants. . . . In this way the mind is centred on this process and the discovery of the pupil that it is fundamentally the same in such widely different plants, arouses a keen interest not only in the plants themselves, but in the method which attends the discovery of this general principle."

The volume is divided into three parts. Part 1 is devoted to the life processes of the plant absorption, transpiration respiration, nutrition and the like. Part 2 discusses the morphology of the plant and the relationships of different families. Part 3, perhaps the most interesting section of the book, is devoted to Ecology or the study of plants in their mutual and environmental relationships. The author fitly points out

that "by a study of the life histories of plants and their habits of behavior under different conditions of environment, we shall broaden our concept of nature and cultivate our æsthetic, observational and reasoning faculties." How much more important this is to the student than to be possessed of a few stray and disconnected facts of natural history! Ecology means study in the field and is the kind of valuable nature study work so heartily and ably encouraged and fostered by The Ottawa Field-Naturalists' Club and the Natural History Society of Montreal Atkinson's Elementary Botany will be of great value to High School Teachers and to Teachers in Collegiate Institutes. It inspires the student by presenting the attractive features first and trains his mind in logical methods of induction, which, as the author observes, is of vast importance in its influence upon the character of the pupil. The book is well printed, beautifully illustrated and substantially bound.

J. C.

WHITEAVES, J. F.—*Contributions to Canadian Palæontology*, Vol. 1, Part V. 7. On some additional or imperfectly understood fossils from the Hamilton formation of Ontario, with a revised list of the species therefrom," pp. 362-436. Plates XLVIII to L, Geological Survey of Canada, Ottawa, 1898.

This palæontological report brings our literature and information on the Hamilton formation of Ontario up to date. So many radical changes have been deemed necessary in the classification and nomenclature of palæontology of late that the revised "list" given by Mr. Whiteaves, pp. 412-418 of this, the 659th contribution or publication of the Geological Survey Department, will prove of great value to all working geologists and palæontologists. A résumé of the various orders and families represented in the Hamilton formation of Canada include the following :—

	Genera.	Species.
Spongiae	2 (?)	4
Alcyonaria	2	2
Zoantharia Rugosa	11	18
Zoantharia Tabulata	7	16
Hydroidea	3	4
Crinoidea	9	11
Blastoidea	6	6
Asteroidea	1	1
Vermes	7	14
Polyzoa	22	40
Brachiopoda	35	61
Pelecypoda	35	61
Gasteropoda	6	13
Pteropoda	3	3
Cephalopoda	4	8
Ostracoda	3	4
Phyllopora	1	1
Trilobita	3	4
Pisces	3 (?)	3 (?)
	141	225

It will thus be seen that from the Hamilton formation of Ontario there are no less than 225 species already reported upon in Canada, showing how varied the life was in those early seas. Comparing these results with those obtained in New York State across lakes Ontario and Erie, it can be readily seen that a great deal has already been done in Canada, also that future years will no doubt reveal a large amount of material as yet unrecorded in Canada. The remarkable similarity in the succession of life-zones in the Hamilton formation of Canada and New York State has been pointed out by Prof. H. S. Williams, now of Yale, and shows that no barrier existed in the Devonian times in the Ontario-New York Basin to prevent free migration of forms to and fro.

An interesting point to ascertain at present in the province of Quebec is to what extent the various life-zones of the Devonian of that province correspond with those of Ontario or of New York State; also the extent and distribution of the various geological formations of the province of Quebec in Devonian times.—H. M. A.

THE LATE PROF. H. ALLEYNE NICHOLSON.

H. ALLEYNE NICHOLSON, M. D., D. Sc., F.R.S.E., F.G.S., etc., etc., Regius professor of Natural History of the University of Aberdeen, St. Andrews, Scotland, died on January 19th, 1899 in his 55th year. He was born at Penrith, Scotland, September 11th, 1844, and educated at Appleby Grammar School, later at Gottingen and Edinburgh University. In 1869 he was appointed lecturer on Natural History in his own Alma Mater, Edinburgh, but two years later, 1871, accepted the offer made him by the Senate of the University of Toronto of the Chair of Natural History. During his stay in Canada from 1871 to 1874, he took a foremost part in advancing the study of Natural Science, including zoology and palæontology. In 1873 Dr. Nicholson finished his first volume of the "*Report upon the Palæontology of the Province of Ontario*," 130 pp., 8 plates, Toronto 1874, which embraced descriptions and figures of the organic remains of the Devonian formations of Western Ontario. The more typical Devonian fossils which Dr. Nicholson had collected, by the liberality of the Legislature, were placed in the Museum of the "College of Technology" Toronto, in 1873. The Second "*Report upon the Palæontology of the Province of Ontario*," printed by order of the Legislative Assembly, contains 96 pages of text and 4 plates of figures illustrating new or rare species of Palæozoic fossils from Ontario. These two volumes have been of great value to students of Geology and Palæontology in Canada ever since. From Toronto, he went to the Durham University Colleges of Physical Science, Newcastle-on-Tyne, and from 1877 to 1882 and again from 1890 to 1894 was lecturer on Geology at the British Museum, London, and subsequently became regius professor of Natural History at the University of Aberdeen St. Andrews. His "Manuals of Palæontology and Zoology" for students, "Tabulate Corals," "Monograph of British Graptolites," "Monograph of British Stromatoporoids" are among his best known and principal works of reference.

Dr. Nicholson also wrote "*Text-book of Geology*" for Schools and Colleges, 266 pages, New York, 1872; and general papers on Geology, Palæontology and mining in Ontario published in the Journals of the Geological Society of London, of the Canadian Institute, Toronto, Geological Magazine and other publications. He was one of the best known and hard working palæontologists. He will be greatly missed by all of us here in Canada, who knew him and with whom he was carrying on correspondence and assisting in so many ways to elucidate points of structure in Canadian fossils.

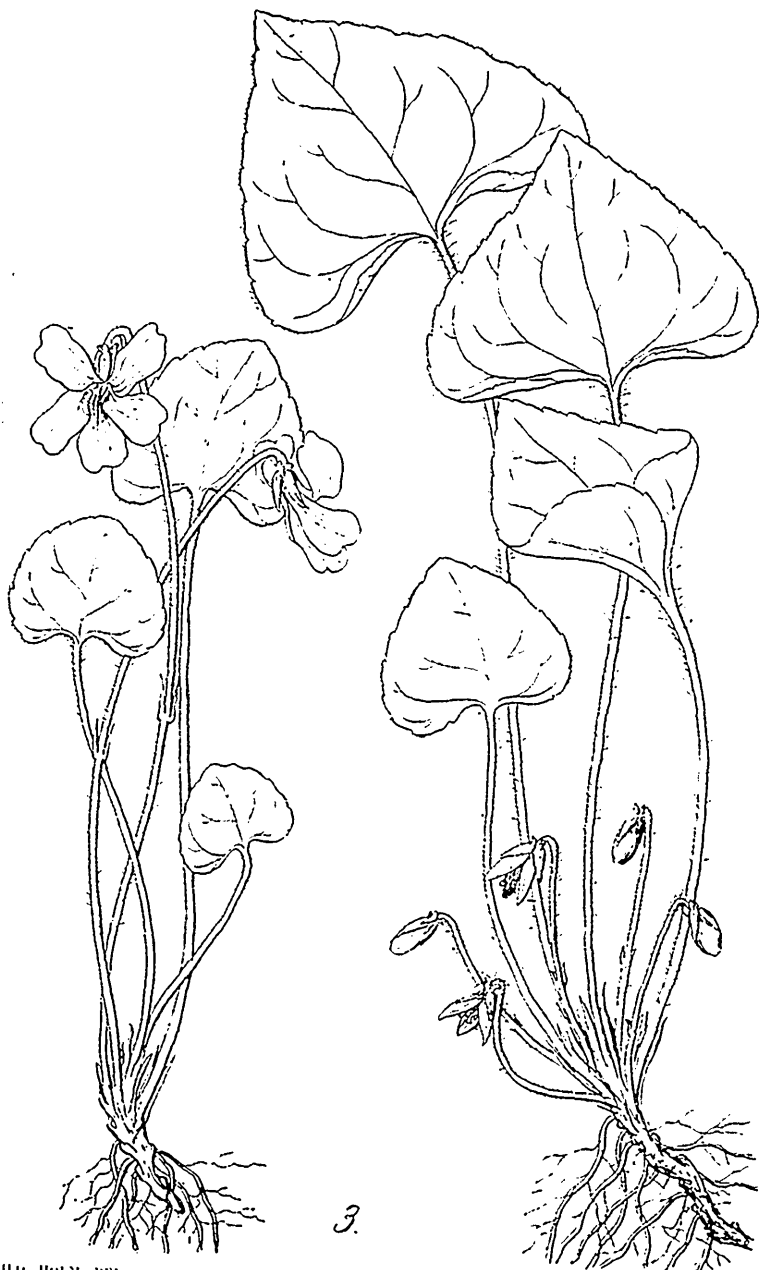
H. M. AMI.



THO. HOLM, DEL.

Fig. 1. VIOLA MACOUNII.
(a.) Leaves and Fruit. (b.) Flower.

Fig. 2. VIOLA VENUSTULA.
(c.) Flower. (d.) Fruit.



H. H. BOEN, DEL.

Fig. 3. VIOLA SEPTENTRIONALIS.

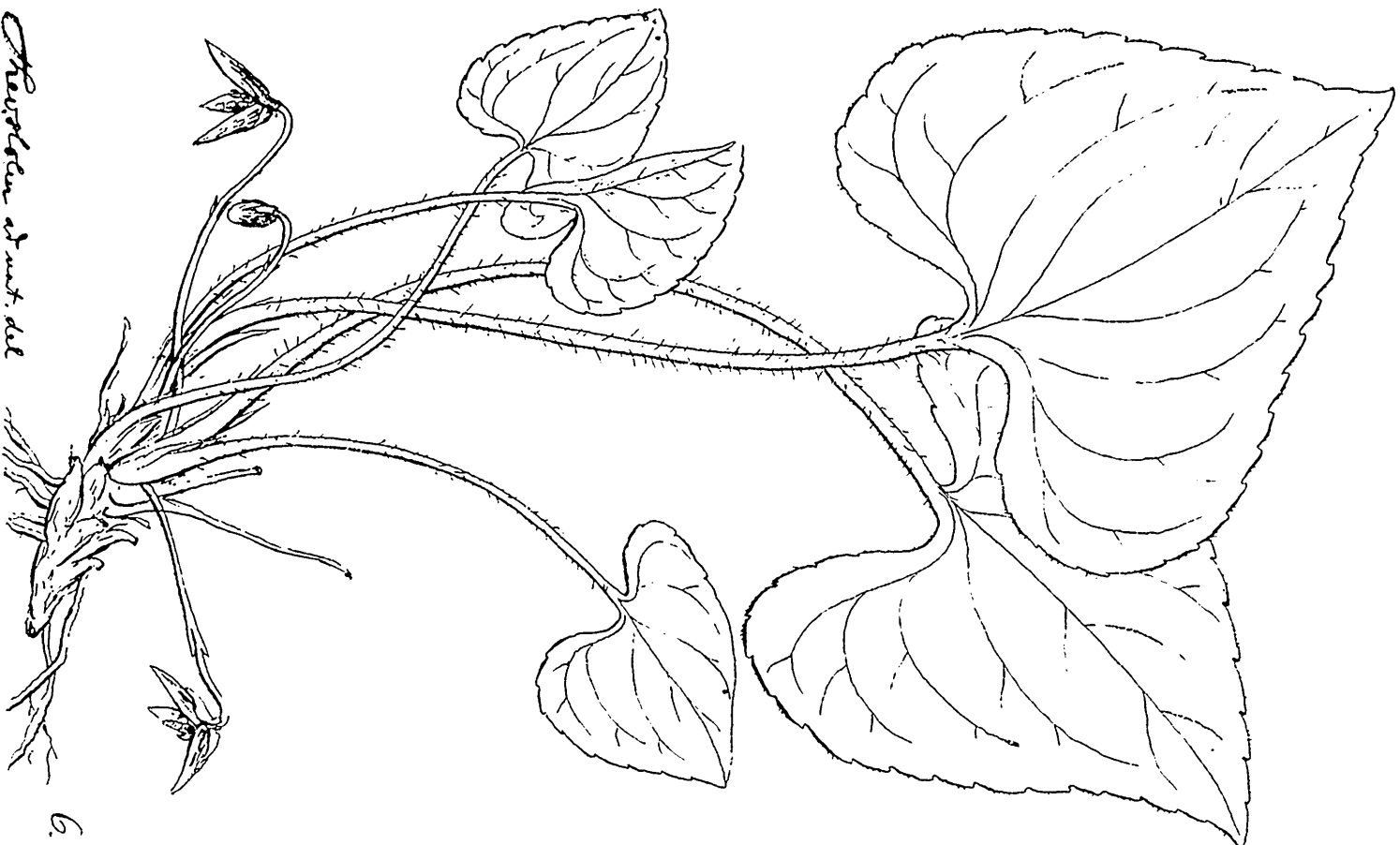
Flower.

Fruit.



Fig. 4. VIOLA POPULIFOLIA.
Fruit.

Fig. 5. VIOLA CUSPIDATA.
Flower.



Chrysopsis at root etc

Fig. 6. VIOLA CUSPIDATA.

Fruit.

6.



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VIOLA CUCULLATA.
Flower.

Fruit.

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